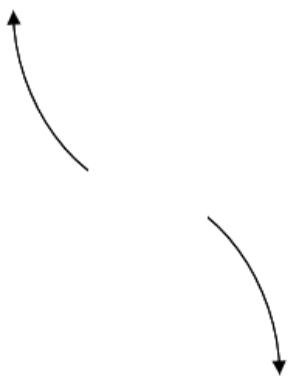
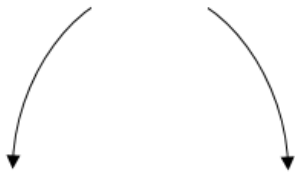
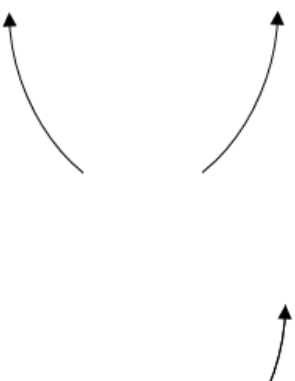



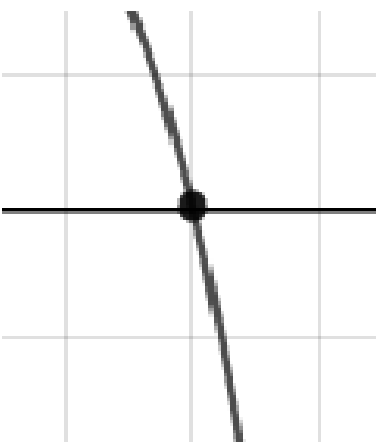
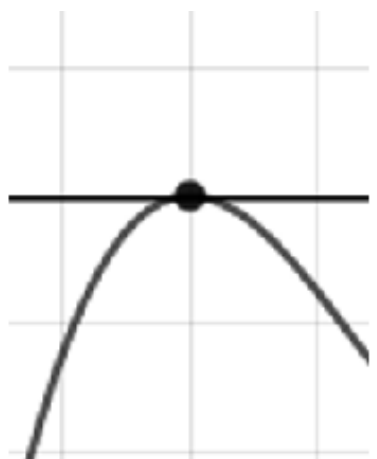
1. Describe the end behavior of the polynomial below.

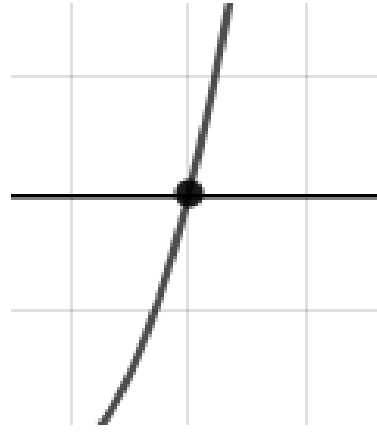
$$f(x) = -3(x + 5)^4(x - 5)^7(x - 7)^4(x + 7)^6$$

- A. 
- B. 
- C. 
- D. 
- E. None of the above.

2. Describe the zero behavior of the zero $x = 3$ of the polynomial below.

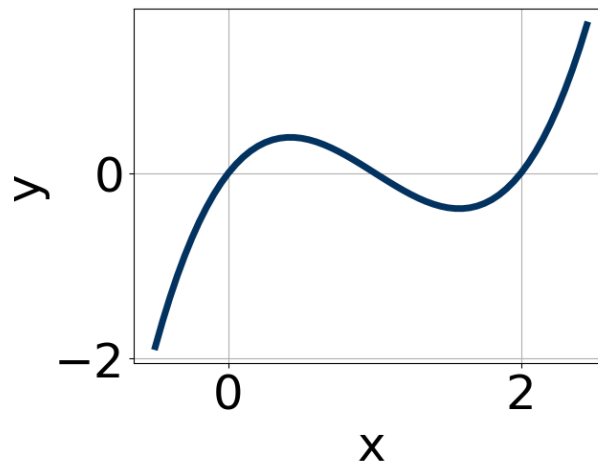
$$f(x) = 6(x - 3)^8(x + 3)^{13}(x - 4)^9(x + 4)^{12}$$

- A. 
- B. 



E. None of the above.

3. Which of the following equations *could* be of the graph presented below?



- A. $4x^7(x-2)^{10}(x-1)^5$
- B. $-8x^9(x-2)^6(x-1)^5$
- C. $18x^7(x-2)^7(x-1)^5$
- D. $7x^{10}(x-2)^8(x-1)^{11}$
- E. $-12x^9(x-2)^5(x-1)^5$

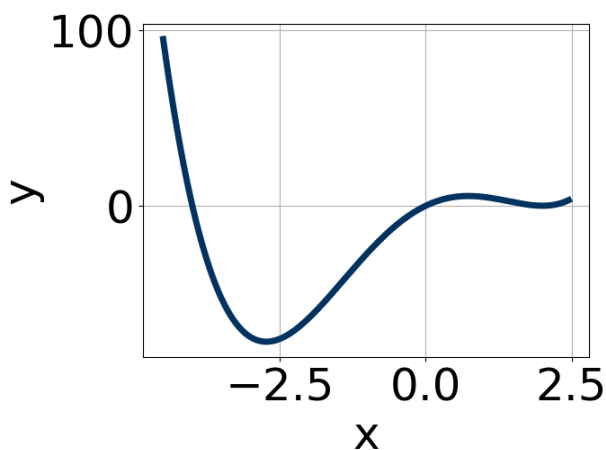
4. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in

the form $x^3 + bx^2 + cx + d$.

$$4 + 5i \text{ and } 2$$

- A. $b \in [7, 16], c \in [56, 57.3]$, and $d \in [81, 86.3]$
- B. $b \in [0, 2], c \in [-6.8, -1.8]$, and $d \in [3.8, 8.5]$
- C. $b \in [0, 2], c \in [-8.8, -6.5]$, and $d \in [8.4, 13.1]$
- D. $b \in [-13, -4], c \in [56, 57.3]$, and $d \in [-84.9, -79.5]$
- E. None of the above.

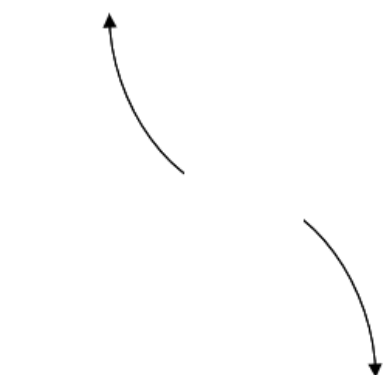
5. Which of the following equations *could* be of the graph presented below?



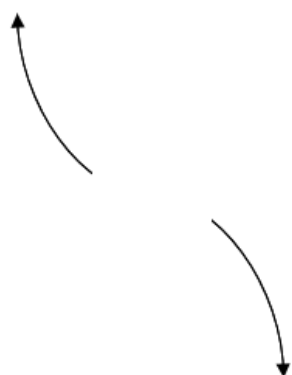
- A. $-18x^9(x - 2)^{10}(x + 4)^8$
- B. $19x^6(x - 2)^9(x + 4)^9$
- C. $-14x^9(x - 2)^6(x + 4)^5$
- D. $11x^9(x - 2)^8(x + 4)^7$
- E. $19x^6(x - 2)^{10}(x + 4)^9$

6. Describe the end behavior of the polynomial below.

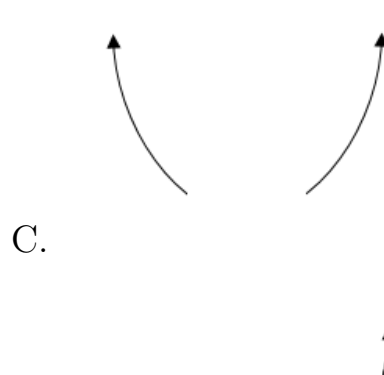
$$f(x) = -3(x + 2)^3(x - 2)^8(x + 6)^5(x - 6)^5$$



A.

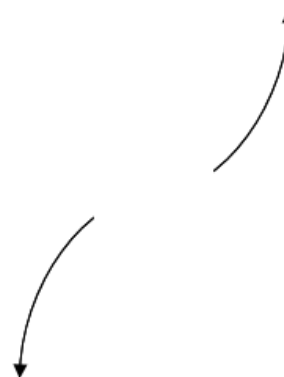


B.



C.

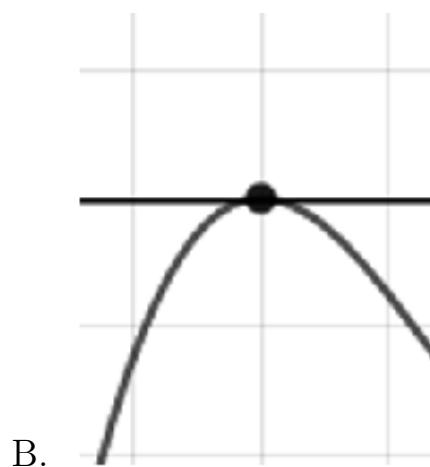
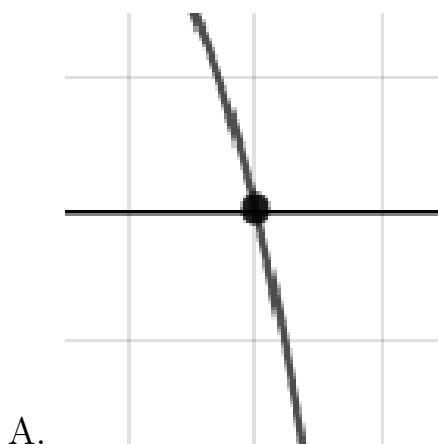
D.



E. None of the above.

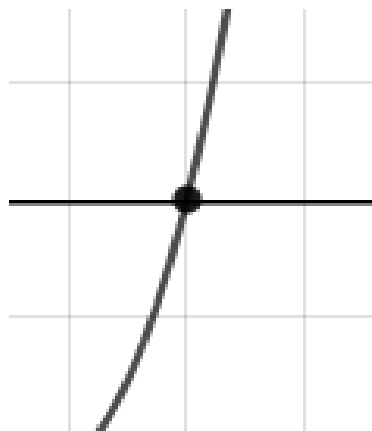
7. Describe the zero behavior of the zero $x = 7$ of the polynomial below.

$$f(x) = 9(x + 8)^9(x - 8)^7(x - 7)^7(x + 7)^2$$





C.



D.

E. None of the above.

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-1}{5}, \frac{-1}{4}, \text{ and } 6$$

- A. $a \in [16, 21], b \in [107, 116], c \in [-55, -47],$ and $d \in [-2, 13]$
 B. $a \in [16, 21], b \in [-137, -123], c \in [51, 61],$ and $d \in [-9, -5]$
 C. $a \in [16, 21], b \in [-113, -106], c \in [-55, -47],$ and $d \in [-2, 13]$
 D. $a \in [16, 21], b \in [-120, -116], c \in [-19, -4],$ and $d \in [-2, 13]$
 E. $a \in [16, 21], b \in [-113, -106], c \in [-55, -47],$ and $d \in [-9, -5]$

9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 4i \text{ and } -2$$

- A. $b \in [-14, -10], c \in [53, 67],$ and $d \in [-88, -77]$
 B. $b \in [1, 6], c \in [-5, -1],$ and $d \in [-8, 0]$
 C. $b \in [1, 6], c \in [7, 8],$ and $d \in [9, 17]$

D. $b \in [9, 25]$, $c \in [53, 67]$, and $d \in [82, 90]$

E. None of the above.

10. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-5}{4}, \frac{-3}{4}, \text{ and } -5$$

A. $a \in [12, 18]$, $b \in [44, 51]$, $c \in [-145, -143]$, and $d \in [73, 83]$

B. $a \in [12, 18]$, $b \in [104, 114]$, $c \in [171, 181]$, and $d \in [-76, -74]$

C. $a \in [12, 18]$, $b \in [72, 73]$, $c \in [-60, -50]$, and $d \in [-76, -74]$

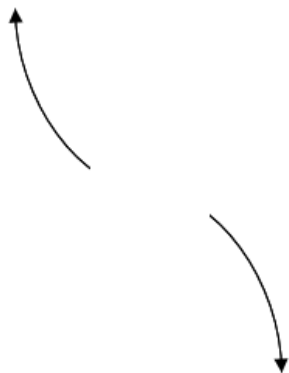
D. $a \in [12, 18]$, $b \in [-114, -109]$, $c \in [171, 181]$, and $d \in [-76, -74]$

E. $a \in [12, 18]$, $b \in [104, 114]$, $c \in [171, 181]$, and $d \in [73, 83]$

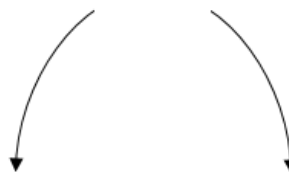
11. Describe the end behavior of the polynomial below.

$$f(x) = 4(x + 3)^4(x - 3)^9(x + 2)^4(x - 2)^6$$

A.

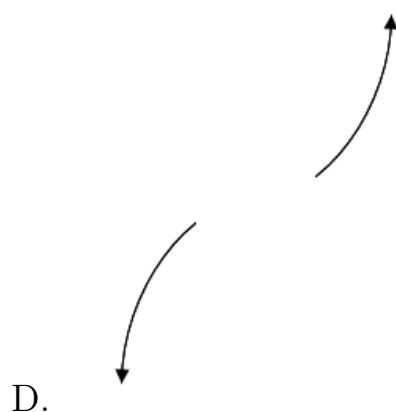


B.



C.





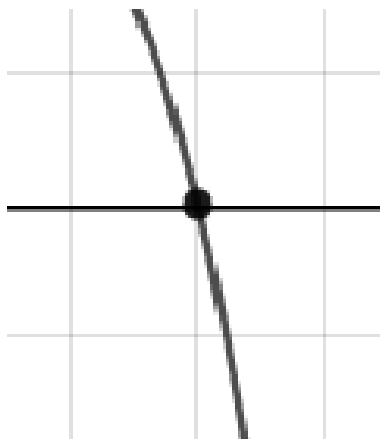
D.

E. None of the above.

12. Describe the zero behavior of the zero $x = -8$ of the polynomial below.

$$f(x) = -3(x + 9)^6(x - 9)^5(x + 8)^{14}(x - 8)^9$$

A.



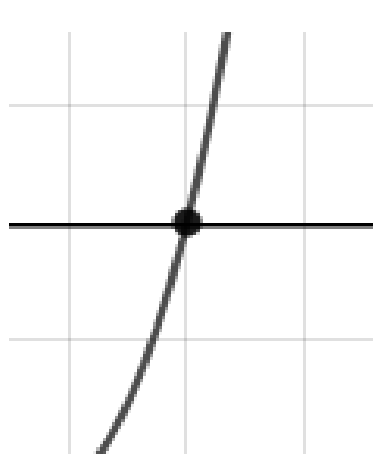
C.



B.

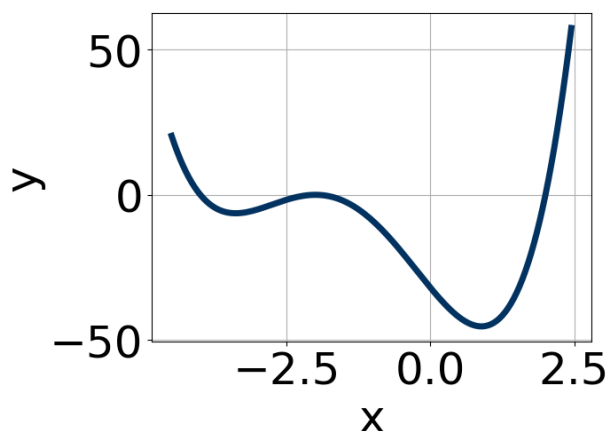


D.



E. None of the above.

13. Which of the following equations *could* be of the graph presented below?



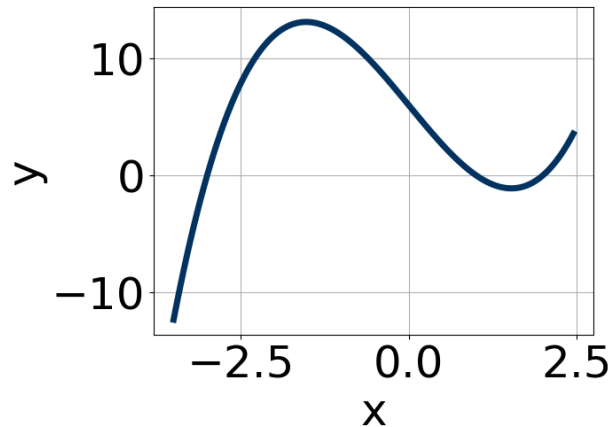
- A. $17(x + 2)^{10}(x - 2)^7(x + 4)^5$
- B. $-9(x + 2)^{10}(x - 2)^9(x + 4)^{11}$
- C. $-18(x + 2)^{10}(x - 2)^{11}(x + 4)^{10}$
- D. $8(x + 2)^7(x - 2)^4(x + 4)^5$
- E. $20(x + 2)^4(x - 2)^4(x + 4)^9$

14. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$3 + 2i$ and 4

- A. $b \in [1, 8], c \in [-7.52, -6.31],$ and $d \in [11, 13]$
- B. $b \in [5, 14], c \in [36.76, 37.91],$ and $d \in [49, 57]$
- C. $b \in [-15, -7], c \in [36.76, 37.91],$ and $d \in [-52, -48]$
- D. $b \in [1, 8], c \in [-6.57, -5.83],$ and $d \in [6, 9]$
- E. None of the above.

15. Which of the following equations *could* be of the graph presented below?

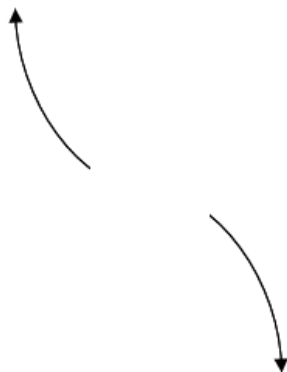


- A. $4(x - 2)^4(x + 3)^6(x - 1)^5$
- B. $16(x - 2)^5(x + 3)^5(x - 1)^5$
- C. $-9(x - 2)^{10}(x + 3)^9(x - 1)^7$
- D. $4(x - 2)^6(x + 3)^7(x - 1)^{11}$
- E. $-10(x - 2)^{11}(x + 3)^5(x - 1)^7$

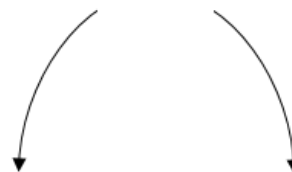
16. Describe the end behavior of the polynomial below.

$$f(x) = -9(x + 8)^4(x - 8)^5(x - 6)^4(x + 6)^5$$

A.

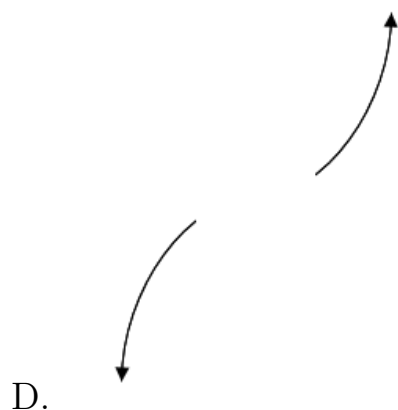


B.



C.



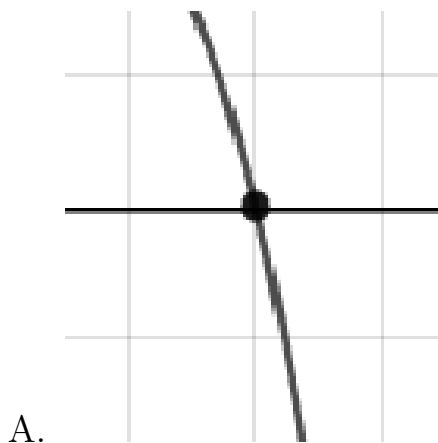


D.

E. None of the above.

17. Describe the zero behavior of the zero $x = -5$ of the polynomial below.

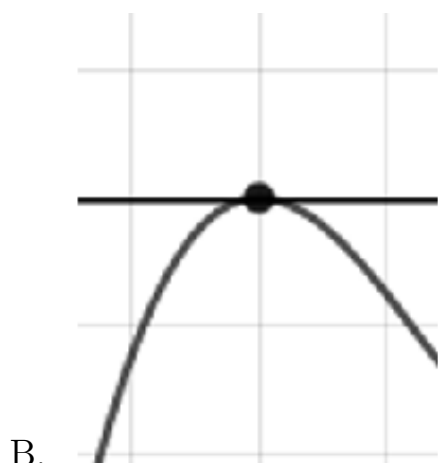
$$f(x) = -9(x - 5)^4(x + 5)^7(x - 9)^4(x + 9)^8$$



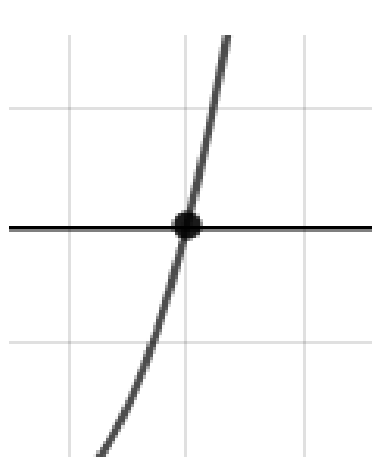
A.



C.



B.



D.

E. None of the above.

18. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$1, \frac{-3}{4}, \text{ and } \frac{6}{5}$$

- A. $a \in [20, 21], b \in [-35, -25], c \in [-9, 1], \text{ and } d \in [15, 24]$
B. $a \in [20, 21], b \in [-22, -14], c \in [-21, -16], \text{ and } d \in [15, 24]$
C. $a \in [20, 21], b \in [27, 36], c \in [-9, 1], \text{ and } d \in [-26, -17]$
D. $a \in [20, 21], b \in [-35, -25], c \in [-9, 1], \text{ and } d \in [-26, -17]$
E. $a \in [20, 21], b \in [10, 12], c \in [-33, -25], \text{ and } d \in [-26, -17]$
-

19. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$3 + 4i \text{ and } 4$$

- A. $b \in [-5, 7], c \in [-7.9, -4.2], \text{ and } d \in [11, 13]$
B. $b \in [-5, 7], c \in [-8.4, -7.9], \text{ and } d \in [13, 18]$
C. $b \in [7, 19], c \in [48.6, 51.5], \text{ and } d \in [98, 101]$
D. $b \in [-10, -4], c \in [48.6, 51.5], \text{ and } d \in [-102, -94]$
E. None of the above.
-

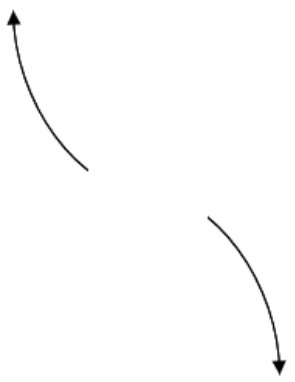
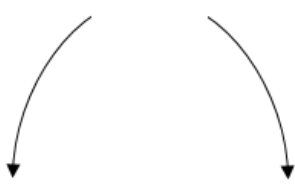
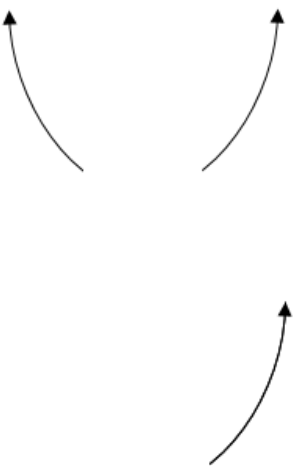

20. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{3}{4}, \frac{5}{2}, \text{ and } -4$$

- A. $a \in [5, 9], b \in [16, 29], c \in [-71, -68]$, and $d \in [-63, -58]$
- B. $a \in [5, 9], b \in [-13, -5], c \in [-95, -76]$, and $d \in [-63, -58]$
- C. $a \in [5, 9], b \in [2, 9], c \in [-95, -76]$, and $d \in [55, 66]$
- D. $a \in [5, 9], b \in [2, 9], c \in [-95, -76]$, and $d \in [-63, -58]$
- E. $a \in [5, 9], b \in [57, 64], c \in [115, 125]$, and $d \in [55, 66]$

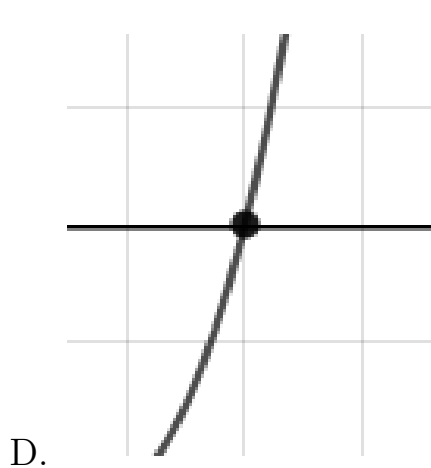
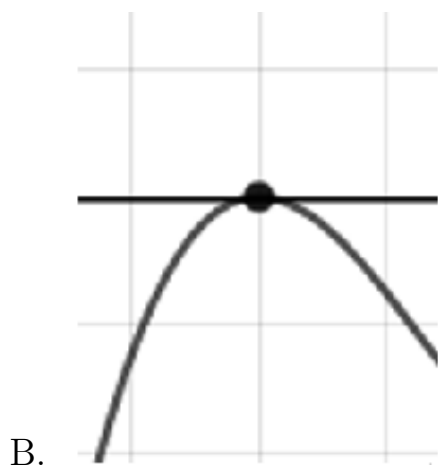
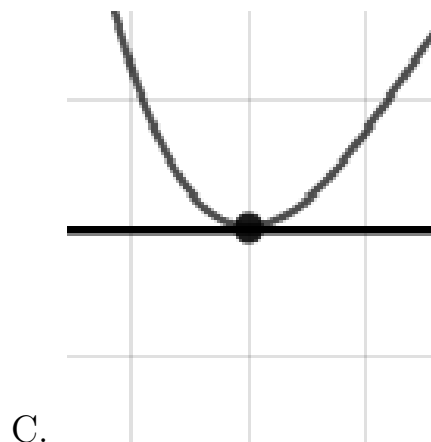
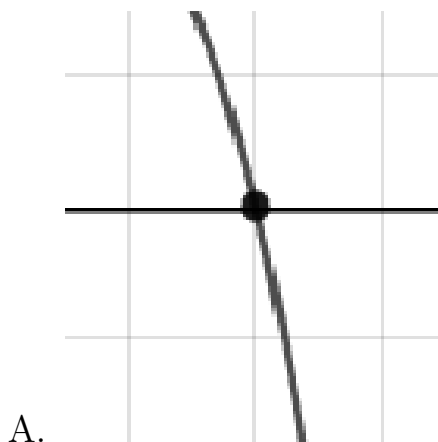
21. Describe the end behavior of the polynomial below.

$$f(x) = 7(x + 5)^4(x - 5)^7(x - 9)^3(x + 9)^3$$

- A. 
- B. 
- C. 
- D. 
- E. None of the above.

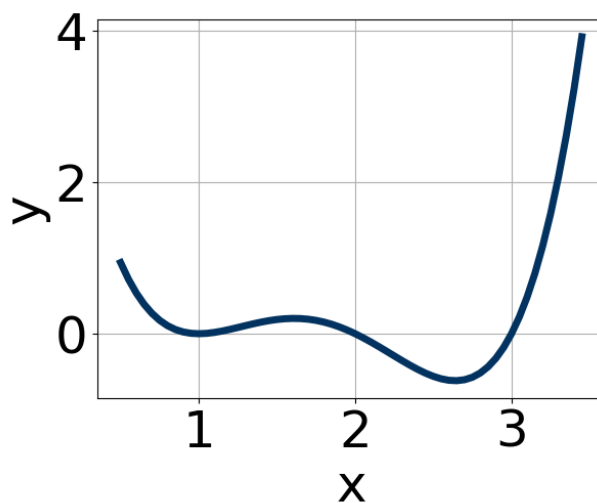
22. Describe the zero behavior of the zero $x = -5$ of the polynomial below.

$$f(x) = 3(x - 3)^9(x + 3)^7(x + 5)^4(x - 5)^3$$



E. None of the above.

23. Which of the following equations *could* be of the graph presented below?



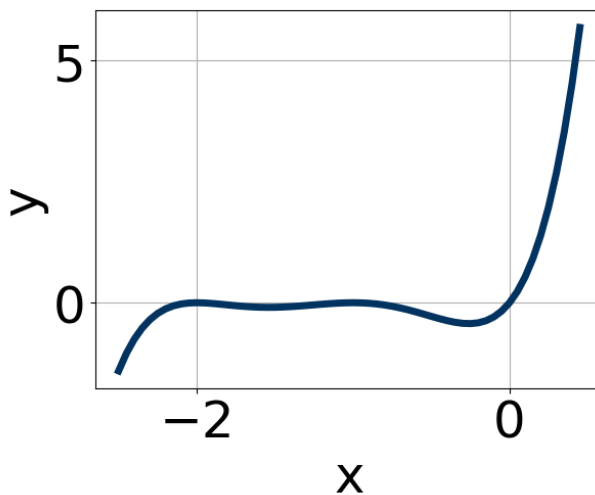
- A. $9(x-1)^{10}(x-2)^8(x-3)^5$
- B. $19(x-1)^7(x-2)^{10}(x-3)^5$
- C. $-11(x-1)^4(x-2)^{11}(x-3)^4$
- D. $7(x-1)^6(x-2)^{11}(x-3)^7$
- E. $-6(x-1)^{10}(x-2)^{11}(x-3)^5$

24. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$5 + 2i \text{ and } 4$$

- A. $b \in [13, 15], c \in [64, 73], \text{ and } d \in [114, 122]$
- B. $b \in [-4, 5], c \in [-19, -7], \text{ and } d \in [17, 23]$
- C. $b \in [-4, 5], c \in [-8, -3], \text{ and } d \in [8, 14]$
- D. $b \in [-16, -13], c \in [64, 73], \text{ and } d \in [-125, -112]$
- E. None of the above.

25. Which of the following equations *could* be of the graph presented below?

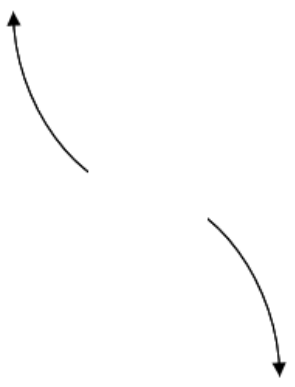
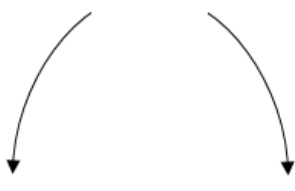
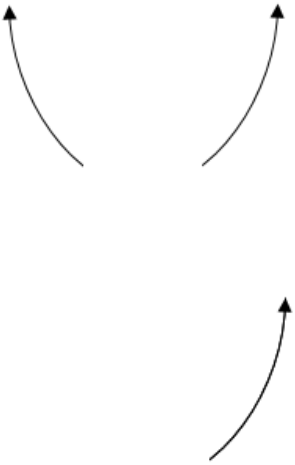



- A. $19x^5(x+1)^6(x+2)^7$

- B. $-14x^7(x+1)^{10}(x+2)^4$
 C. $14x^6(x+1)^{10}(x+2)^9$
 D. $-11x^4(x+1)^{10}(x+2)^4$
 E. $2x^9(x+1)^8(x+2)^{10}$

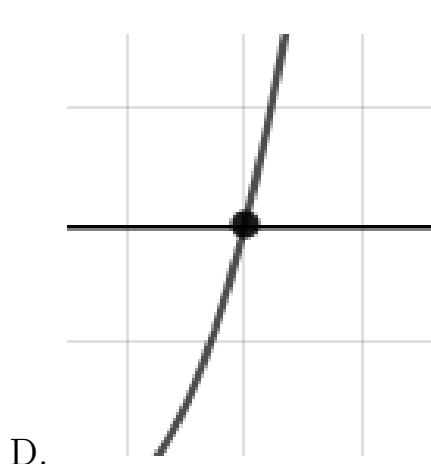
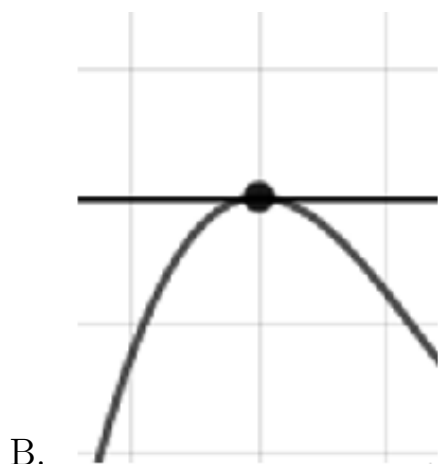
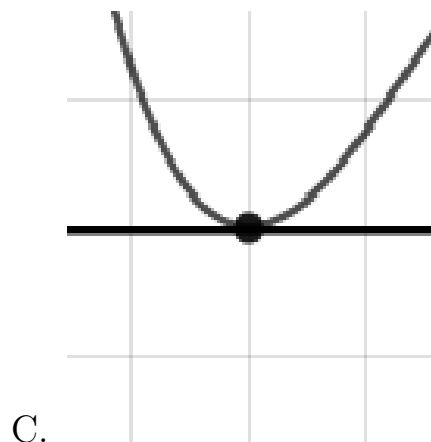
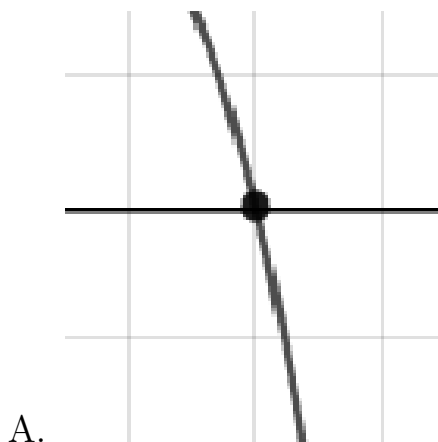
26. Describe the end behavior of the polynomial below.

$$f(x) = -4(x-4)^3(x+4)^6(x+8)^5(x-8)^5$$

- A. 
- B. 
- C. 
- D. 
- E. None of the above.

27. Describe the zero behavior of the zero $x = 9$ of the polynomial below.

$$f(x) = -7(x-9)^4(x+9)^7(x+2)^6(x-2)^7$$



E. None of the above.

28. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{1}{4}, 4, \text{ and } \frac{3}{5}$$

- A. $a \in [12, 21], b \in [-101, -93], c \in [61, 75], \text{ and } d \in [-15, -8]$
 B. $a \in [12, 21], b \in [-101, -93], c \in [61, 75], \text{ and } d \in [8, 15]$
 C. $a \in [12, 21], b \in [-88, -82], c \in [23, 26], \text{ and } d \in [8, 15]$
 D. $a \in [12, 21], b \in [95, 101], c \in [61, 75], \text{ and } d \in [8, 15]$
 E. $a \in [12, 21], b \in [69, 77], c \in [-36, -28], \text{ and } d \in [-15, -8]$

29. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-3 + 2i \text{ and } 1$$

- A. $b \in [-8, -3], c \in [7, 8], \text{ and } d \in [11, 14]$
 - B. $b \in [2, 8], c \in [7, 8], \text{ and } d \in [-16, -8]$
 - C. $b \in [1, 2], c \in [0, 4], \text{ and } d \in [-5, -2]$
 - D. $b \in [1, 2], c \in [-7, 1], \text{ and } d \in [0, 5]$
 - E. None of the above.
-

30. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$4, \frac{-3}{5}, \text{ and } \frac{3}{4}$$

- A. $a \in [19, 26], b \in [81, 88], c \in [3, 6], \text{ and } d \in [-37, -33]$
 - B. $a \in [19, 26], b \in [76, 78], c \in [-22, -18], \text{ and } d \in [-37, -33]$
 - C. $a \in [19, 26], b \in [-85, -80], c \in [3, 6], \text{ and } d \in [29, 39]$
 - D. $a \in [19, 26], b \in [46, 63], c \in [-101, -94], \text{ and } d \in [29, 39]$
 - E. $a \in [19, 26], b \in [-85, -80], c \in [3, 6], \text{ and } d \in [-37, -33]$
-